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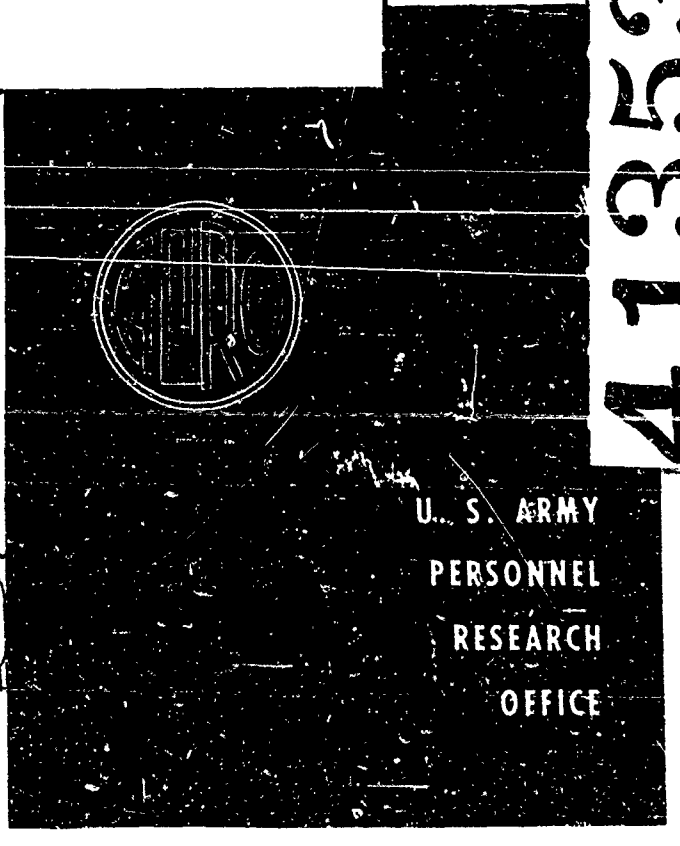
Technical Research Note 128

GROUPING ARMY TRAINING COURSES BY ARMY CLASSIFICATION BATTERY FACTORS

Serial-4



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An activity of the Chief, Research and Development

Charles S. Gersoni
Colonel, GS
Commanding

J. E. Uhlaner
Director, Research Laboratories

Hubert E. Brogden
Chief Scientist

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(1) GROUPING ARMY TRAINING COURSES BY ARMY CLASSIFICATION BATTERY FACTORS,

(10) by William H. Helme and David J. Fitch

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(20) U

(21) NH

Submitted by Edmund F. Fuchs
Chief, Military Selection Research Laboratory

Approved by

J. E. Uhlaner
Director, Research Laboratories

Hubert E. Brogden
Chief Scientist

Charles S. Gersoni
Colonel, GS
Commanding

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PREFACE

The present publication reports on a portion of Subtask c, "Preparation of selected alternate ACB tests," of the NEW CLASSIFICATION TECHNIQUES Task, FY 62 Work Program. The entire research task is responsive to special requirements of the Deputy Chief of Staff for Personnel, the Deputy Chief of Staff for Logistics, and the U. S. Continental Army Command, and furthers the U. S. Army Military Personnel Management objective of developing, and making available for operational use, research findings and products to optimize the selection, classification, management, and utilization of Army personnel.

Development of test materials that will increase the effectiveness of the operational Army Classification Battery is a continuing task. The importance to the Army of personnel decisions made on the basis of the ACB makes it particularly necessary that these tests be kept current. Measures are also needed of human factors not yet provided for in the ACB, including measures of physical proficiency to predict whether an individual will continue to meet the physical requirements of his assignment. Additional measures of personal factors to indicate what a man will do on the job, as opposed to what he can do, are especially needed.

The primary objectives of the NEW CLASSIFICATION TECHNIQUES Task are to explore new test content that will increase the effectiveness of classification and assignment in the Army, and to construct up-to-date tests to maintain the effectiveness of tried and tested measures in operational use. A special requirement involves determination of effective combinations of screening and classification measures to evaluate the potential usefulness to the Army of applicants for enlistment and selective service registrants.

BRIEF

GROUPING ARMY TRAINING COURSES BY ARMY CLASSIFICATION BATTERY FACTORS

Requirement:

Relationship of Army Classification Battery (ACB) tests to jobs in the Army's MOS structure is under continuous scrutiny to maintain effective use of the psychological measures basic to training and job assignment.

Procedure:

Results of validity studies of ACB tests and aptitude areas as predictors of final grades in 75 Army training courses were analyzed to delineate occupational groupings of Army jobs in terms of test-job interrelationships. The 75 MOS were allocated to ten job groups, and the effectiveness of ACB tests for differentially predicting success in the ten groups was assessed.

Results:

Nine of the job groups were well differentiated by test combinations which were much like current aptitude area selectors. Such differences as were found suggested that technical level as well as subject content is useful in differentiating between job groups, particularly in the case of electronics versus mechanical trades and services. Academic skills were found to play a part in success in all courses.

Utilization of Findings:

MOS groupings resulting from the analysis provide guidelines which, in conjunction with across-the-board validation studies of experimental tests now being developed, will eventually be applied in adjustment of the Aptitude Area system.

GROUPING ARMY TRAINING COURSES BY ARMY CLASSIFICATION BATTERY FACTORS

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GROUPING ARMY TRAINING COURSES BY ARMY CLASSIFICATION BATTERY FACTORS

APTITUDE AREAS AND OCCUPATIONAL GROUPINGS

Under the current Aptitude Area System, enlisted men are classified for training on the basis of eight aptitude area scores, each score a composite of standard scores on two tests of the Army Classification Battery (ACB). All enlisted Military Occupational Specialties (MOS) are grouped into ten occupational areas. Each aptitude area serves as a prerequisite to an occupational area, a group of MOS within an occupational area, or two related occupational areas. The correspondence between aptitude areas and occupational areas or subareas was first established in 1955. Since that time, the Combat Aptitude Area has been divided into two areas on the basis of research findings: Infantry (IN) for selection of enlisted men for infantry MOS, and Armor-Artillery-Engineer (AE), selector for all other MOS in the Combat occupational area (Willemin and Karcher, 1958). Also since 1955, changes in the assignment of MOS to occupational areas have been made. While these changes were instigated primarily for management reasons, they have also been kept compatible with research findings on aptitude areas.

Reconstitution of the Aptitude Area System in 1955 was based on findings on 31 MOS (Zeidner, Harper, and Karcher, 1956). Under a continuing research program, studies of the relation of ACB scores to performance in training courses and in Army jobs have been conducted. On the basis of 75 such studies, in which samples of 200 or more men were studied in each training course, a comprehensive analysis of the relation of the ACB to final grades in Army Service School enlisted courses has been completed. The present report interprets the results of a factor analysis of the ACB, extended to the 75 MOS courses, in terms of the occupational groupings suggested by the data.

METHOD OF ANALYSIS

Study of 35 MOS revealed that, when MOS were grouped according to patterns of ACB validity coefficients in a set of analysis samples, there was little shrinkage in the multiple prediction in applying these weights to validation samples of the same group of MOS (Helme, Gibson, and Brogden, 1957). Using one of the two sets of samples of 34 MOS--one of the 35 samples was omitted in view of negligible validity of all ACB tests--Gibson carried out a diagonal factor analysis (unpublished) of the ten ACB tests then current, using unity in the diagonals, and extended the factors to the 34 training course criteria. By graphic orthogonal rotation, he was able to subsume virtually all the variance common to ACB tests and criteria in only four of the ten factors. When data on 41 additional MOS training courses were obtained, Gibson's factors were extended to these MOS as well. Although most of the valid variance was still covered by the four rotated factors, there was a suggestion of two possible additional factors. Rotation of the ten test factors yielded a new orthogonal configuration in which one broad general factor, two large group factors, and three small group factors appeared.

Using this six-factor configuration, the 75 MOS were grouped in clusters by inspection and trial fitting. Each grouping showed a unique mean loading on at least one factor. No grouping had a standard deviation on any factor in excess of .100 (except in rare instances on the general factor). Average zero-order ACB test validity coefficients were then obtained for each cluster, and standard regression weights were computed. The results were then evaluated for suggestions as to changes in the aptitude area structure. However, there was no intention of implementing such changes on the basis of the present study alone. Instead, the results were interpreted as additional guidelines for (1) developing new ACB measures and (2) eventual reconstitution of the aptitude area structure.

RESULTS

The standard matrix of ACB test intercorrelations for a full mobilization population is reproduced in Table A-1 in the Appendix. Table A-2 shows validity coefficients[1/] of ACB tests for the 34 MOS samples used in Gibson's analysis. Table A-3 shows coefficients for the 41 additional samples to which Gibson's original factor solution was later extended. Table A-4 gives the factor loadings of the 34 samples on the ten unrotated diagonal factors. Loadings resulting from Gibson's rotation are given for the 34 MOS in Table A-5, for the 41 additional samples in Table A-6. Final factor loadings of the 75 criteria and the ten ACB tests are presented in Table A-7. These statistics formed the basis of the clustering of MOS into ten occupational groupings.

Table 1 presents the ten occupational clusters, with the means and standard deviations of loadings on each of the six valid factors (See Figure 1 for MOS constituting the ten clusters). Table 2 shows the full standard regression weights of the ACB tests for each job cluster, obtained by multiplying the mean validity coefficients of tests for each cluster by the inverse of the standard matrix of ACB test intercorrelations. Weights for the first two clusters, Electronics Systems and Radio Communications, were highly similar, although the latter group was characterized by a substantially higher multiple validity coefficient (.80 as compared to .66). The two clusters were combined, since the patterns of validity were so similar.

For differential classification, Brogden (1955) has demonstrated that with a given battery optimal prediction, both absolute and differential, is obtained by use of the full regression equations. He has also demonstrated (Brogden, 1959) that any given constant may be added to the beta weights of a predictor for all the criteria without changing the effectiveness of differential allocation. Using the ACB beta weights for the

1/ All validity coefficients were corrected for restriction in range on the aptitude area composite used for selection in the given course at the time.

Cluster	Current MOS	
Electronics Systems	223.1	Nike Electronic Maintenance
	231.1	Light Fire Control Equipment Repair
	233.1	Light Air Defense Artillery Fire Control Maintenance
	234.1	Heavy Air Defense Artillery Fire Control Maintenance
	281.1	Microwave Radio Equipment Repair
	282.1	Radar Repair
Radio Communication	271.1	Fixed Station Radio Maintenance
	294.1	Field Carrier Equipment Repair
	296.1	Field Radio Repair
	311.1	Infantry Radio Maintenance
	312.1	Armor Radio Maintenance
	313.1	Artillery Radio Maintenance
Wire Communication	311.7 (311.6)	Infantry Communications Supervisor
	313.7 (313.6)	Artillery Communications Supervisor
	320.0	Field Wireman
	322.1	Cable Splicing
	331.1 (327.1)	Manual Central Office Repair
	341.1	Teletypewriter Equipment Repair
Mechanical Trades	351	Power Equipment Maintenance
	411.2	Ammunition Records
	421.1	Small Arms Weapons Repairman
	422.1	Field Artillery Repair
	423.1	Air Defense Artillery Repair
	424.1	Turret Artillery Maintenance
	424-2	Turret Artillery Repairman
	442.1	Welding
	546 (L)	Laundry and Dry Cleaning Machine Operation
	550.0	Supply Handling
Motor Maintenance	621	Engineer Equipment Maintenance
	631.1	Automotive Mechanics
	632.1	Artillery Track Vehicle Maintenance
	632.2	Armor Track Vehicle Mechanic
	635.1 (T)	Automotive Repair (Track Vehicle)
	635.1 (W)	Automotive Repair (Wheel Vehicle)
	675.1	Helicopter Maintenance
	676.1	Reconnaissance Helicopter Repairman

Cluster	Current MOS	
Clerical	710.0	Basic Army Administration
	712.1	Stenography
	714.1	Postal Operations
	716.1	Personnel Administration Specialist
	716.2	Personnel Management Specialist
	717.7	Advanced Army Administration
	719.1	Transportation Movement Control
	730.0	Finance Procedures
	760.0	Supply Records
	763.1	Ordnance Supply
	768.1	Unit Supply
General Technical	740.0	Tabulating Machine Operator
	743.1	Machine Accounting Specialist
	841.2	Motion Picture Photographer
	843.1	Photographic Laboratory Procedures
	911.2	Medical Aid Procedures, Advanced
	917.1	Dental Assistant
	931.1	Medical Laboratory Procedures
	933.1	Preventive Medicine Procedures
	934.1	Food Inspection Procedures
	935.1	X-ray Procedures
	951.1	Military Police, Enlisted Advanced
	952.1	Disciplinary Guard, Enlisted
	953.1	Criminal Investigation
	981.1	Cryptanalysis
	982.1	Traffic Analysis
	058.1	Morse Code Interception
	059.1	Teletype Interception
Services	546.1 (F)	Fumigation and Bath Procedures
	910.0	Medical Technician
	914.1	Neuropsychiatric Procedures
	941.1	Cooking
Radio Code	051.1 (I)	Radio Operator (Intermediate Speed)
	051.2 (H)	Radio Operator (High Speed)
Precision Maintenance	403.1	Fire Control Instrument Repair
	443.1	Machinist
	452.1	Dental Laboratory Procedures
	634.1	Fuel and Electrical Systems Repair
	635-C (635.2)	Automotive Rebuild

Figure 1. MOS constituting the ten occupational clusters on which analysis was based.

nine job clusters, constants were added so as to maximize the number of near-zero weights. The results, shown in Table 3, indicate that, except for some negative weights for the small Radio Code Operations cluster (two MOS only), weights on three ACB tests serve clearly to differentiate each cluster. Conversely, ACB tests are clearly differentially valid for different clusters.

INTERPRETATION OF RESULTS

The use of factor analysis to cluster MOS training courses in terms of aptitude predictors yielded a differentiation of noncombat MOS into seven well defined and two marginally defined occupational groups. For differential classification, the clusters were, in almost every case, well predicted by use of weights on three ACB tests each. Comparison of these sets of predictive tests with the currently-used aptitude area composites showed a high degree of correspondence (Figure 2).

The above comparison is revealing in several respects: First, Wire Communications MOS are best predicted by a composite of tests making up the current General Maintenance (GM) area, plus one component of the Electronics area. Second, both the Mechanical Trades cluster and the Services cluster were best predicted by a combination of tests primarily from the Clerical and Motor Maintenance areas. Third, some value for predicting General Technical MOS is found in the Radio Information measure, the more technically complex of the two electrical-electronics tests. And finally, the Automotive Information test shows a weight for every area (except clerical) for which there is no appreciable RI weight. AI is the mechanical measure with the most concrete factual content and the least loading on abstract reasoning or verbal factors. In a sense, it is at a far lower technical level than RI.

These relationships suggest that MOS training courses might well be clustered on the basis of technical level as well as by content, with the Electronics Systems and Radio Communications at a high level along with certain General Technical MOS; the Wire Communications and Precision Maintenance at an intermediate level; and such clusters as the Mechanical Trades, Motor Maintenance, and Services at a rather concrete, specific level. The importance of RV and ACS for these latter courses may reflect the need for facility in academic skills in all courses, accentuated particularly where the technical level is lower. Validation for on-job criteria would throw some light on this hypothesis. Findings of another research study (Helme, Denton, and Anderson, 1962) of the Common Specialist Automotive Helper course (MOS 630) showed VE to be weighted substantially for the final course grade criterion, but not for the practical performance course criterion nor for the instructors' estimates of on-job capabilities per se. These interpretive hypotheses may be more effectively tested in a forthcoming analysis of 21 MOS, for which data on 17 cognitive and 7 noncognitive experimental measures, as well as the current 11-test ACB, are available.

Occupational Cluster	High Weighted Tests	Current Aptitude Area	Component Tests of Current Aptitude Area
Electronics Systems and Radio Communications	Mechanical Aptitude Electrical Information Radio Information	Electronics	Mechanical Aptitude Electronics Information (replaced Electrical Information and Radio Information July 1957)
Wire Communications	Pattern Analysis Shop Mechanics Radio Information	Electronics	Mechanical Aptitude, Electronics Information
Precision Maintenance	Pattern Analysis Shop Mechanics Automotive Information	General Maintenance or Motor Maintenance	Pattern Analysis, Shop Mechanics Mechanical Aptitude, Automotive Information
Mechanical Trades	Reading and Vocabulary Army Clerical Speed Shop Mechanics Automotive Information	General Maintenance	Pattern Analysis Shop Mechanics
Motor Maintenance	Automotive Information	Motor Maintenance	Mechanical Aptitude, Automotive Information
Clerical	Reading and Vocabulary Arithmetic Reasoning Army Clerical Speed	Clerical	Verbal (replaced Reading and Vocabulary July 1957), Army Clerical Speed
General Technical	Reading and Vocabulary Arithmetic Reasoning Radio Information	General Technical	Verbal, Arithmetic Reasoning
Services	Reading and Vocabulary Army Clerical Speed Automotive Information	General Technical or General Maintenance	Verbal, Arithmetic Reasoning or Pattern Analysis, Shop Mechanics
Radio Code Operations	Reading and Vocabulary Army Radio Code Aptitude Automotive Information	Radio Code	Verbal, Army Radio Code Aptitude
Negative	Arithmetic Reasoning Pattern Analysis Shop Mechanics		

Figure 2. Occupational clusters resulting from factor analysis compared with current selector composites.

Table 1

TEN MOS CLUSTERS BASED ON FINAL ROTATION OF TEN ACB FACTORS, SHOWING MEANS AND STANDARD DEVIATIONS OF FACTOR LOADINGS ON EACH CLUSTER

	Factor Loadings											
	Means[a]						S. D.[a]					
MOS Cluster	I (RV)	V (ACS)	VI (ARC)	VII (SM)	VIII (AI)	X (RI)	I (RV)	V (ACS)	VI (ARC)	VII (SM)	VIII (AI)	X (RI)
Electronics Systems	380	-015	032	107	053	495	127	075	072	081	064	064
Radio Communications	592	035	013	180	040	483	099	034	077	048	059	034
Wire Communications	492	060	-042	232	062	347	051	054	054	038	104	049
Precision Maintenance	404	012	-054	428	074	424	079	101	104	060	079	061
Mechanical Trades	529	093	-011	419	210	175	086	089	046	078	093	090
Motor Maintenance	384	005	024	360	281	290	083	037	037	081	090	094
Clerical	658	250	041	088	080	115	063	055	057	090	074	052
General Technical	595	072	055	080	006	255	089	074	074	084	072	050
Services	310	132	032	158	105	060	087	081	075	128	059	041
Radio Code Operations	175	190	350	120	025	140	015	030	060	060	035	080

[a]Decimal points omitted.

Table 2

STANDARD REGRESSION WEIGHTS[a] OF TEN ACB TESTS
IN PREDICTING MOS COURSE CRITERIA
IN EACH MOS CLUSTER

MOS Cluster	ACB Tests										Multiple R
	RV	AR	PA	MA	ACS	ARC	SM	AI	EI	RI	
Electronics Systems	-06	25	11	29	-13	-01	-13	-02	20	26	64
Radio Communications	-02	25	18	24	-01	01	-05	-06	23	27	80
Wire Communications	01	19	19	14	02	01	05	00	13	15	66
Precision Maintenance	-09	10	26	24	-11	06	18	12	07	09	73
Mechanical Trades	14	17	14	10	12	-02	09	25	02	-08	74
Motor Maintenance	04	16	06	18	03	-05	-02	34	08	04	67
Clerical	25	39	-02	13	22	00	-13	-10	08	04	72
General Technical	22	31	09	21	-01	00	-15	-13	11	16	66
Services	11	11	00	12	15	00	-07	07	06	-09	40
Radio Code Operations	11	01	-17	18	07	33	-30	17	09	03	48
Electronics Systems and Radio Communications	-04	25	15	27	-07	00	-09	-04	22	27	

[a]Decimal points omitted.

Table 3

REDUCED REGRESSION WEIGHTS[a] OF TEN ACB TESTS
IN PREDICTING MOS COURSE CRITERIA
IN EACH MOS CLUSTER

MOS Cluster	ACB Tests									
	RV	AR	PA	MA	ACS	ARC	SM	AI	EI	RI
Added Constant:	00	-16	-06	-15	+02	00	+08	+04	-08	00
Electronics Systems and Radio Communications	--	--	--	12	--	--	--	--	14	27
Wire Communications	--	--	13	--	--	--	13	--	--	15
Precision Maintenance	--	--	20	--	--	--	26	16	--	--
Mechanical Trades	14	--	--	--	14	--	17	29	--	--
Motor Maintenance	--	--	--	--	--	--	--	38	--	--
Clerical	25	23	--	--	24	--	--	--	--	--
General Technical	22	15	--	--	--	--	--	--	--	16
Services	11	--	--	--	17	--	--	11	--	--
Radio Code Operations	11	-15	-23	--	--	33	-22	21	--	--

[a]All weights from -.09 to .09 omitted from table. Decimal points omitted.

SUMMARY

A diagonal factor analysis of the ten ACB tests in use up to July 1957 was extended to 75 criteria--final grades in enlisted MOS training courses representing all occupational areas except Combat. Orthogonal rotation in the predicted criterion space yielded a set of six factors accounting for virtually all valid variance of the ACB: one large general factor, two large group factors (electronic and mechanical), and three small group factors (clerical, motor mechanics, and radio code operations). On the basis of the final loadings, the 75 MOS were grouped in ten clusters. Using average validity coefficients of each ACB test for given clusters, the full standard regression equations for each cluster were derived.

The results indicated good differentiation of prediction for nine clusters; two clusters differed only in level of prediction and were combined. The job clusters and the test combinations resembled current occupational areas and aptitude area selector composites to a considerable degree. Patterns of validity suggested that MOS courses may, for classification purposes, be clustered on the basis of technical level as well as on content, and that academic skills as represented by variance predicted by verbal and clerical speed tests play a part in all courses.

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APPENDIX

Tables A-1 through A-7. Statistical Data forming the basis for clustering MOS into ten occupational groupings.

Table A-1

STANDARD MATRIX OF INTERCORRELATIONS OF ARMY CLASSIFICATION BATTERY TESTS, BASED ON LARGE-SAMPLE DATA REPRESENTATIVE OF WORLD WAR II MOBILIZATION ENLISTED POPULATION[a]

ACB Test		Intercorrelations[b]									
1.	RV	1									
2.	AR	68	2								
3.	PA	55	60	3							
4.	MA	50	55	50	4						
5.	ACS	50	50	50	45	5					
6.	ARC	40	45	40	35	45	6				
7.	SM	60	60	50	70	45	30	7			
8.	AI	40	45	40	60	25	25	65	8		
9.	EI	45	50	45	50	30	35	58	50	9	
10.	RI	25	30	25	30	20	25	35	30	50	10

[a]From USAPRO Technical Research Report 996 (Campbell, Johnson, Brown, and Birnbaum, 1952).
[b]Decimal points omitted.

Table A-2

VALIDITY COEFFICIENTS[a] OF ARMY CLASSIFICATION BATTERY TESTS
FOR 34 ARMY MOS COURSE CRITERIA

Current MOS	Course Title	N	ACB Tests RV	AR	PA	MA	ACS	ARC	SM	AI	EI	RI
271-2	Fixed Sta Radio Rep	310	58	69	58	61	38	52	57	42	67	62
281	Microwave-Mult Channel Rep	216	36	52	41	48	23	16	44	40	55	54
282	Radar Rep	242	38	46	40	55	22	24	32	38	50	48
296	Field Radio Rep	280	54	62	60	57	39	42	59	50	63	48
320	Field Wireman	330	45	49	48	43	31	32	52	43	58	40
403	FC Instrument Rep	214	52	49	58	59	34	31	54	50	52	37
411	Ammunition Supply	767	54	55	45	42	44	28	50	42	38	20
421	Small Arms Weapons Mech	418	53	60	60	61	48	34	69	64	44	26
422	Arty Mech-Light Weapons	196	64	64	57	58	54	29	63	60	49	13
424.2	Turret Arty Rep	183	66	70	60	62	52	41	66	61	44	28
442	Welder	236	55	50	59	59	37	33	56	56	38	19
443	Machinist	296	38	59	57	58	33	30	66	46	46	34
452	Dental Lab	100	38	44	52	60	24	29	53	40	40	28
632.2	Armor Track Veh Maint	248	48	56	54	65	36	36	58	63	56	34
634	Fuel and Elec Systems Rep	523	51	61	56	70	22	35	63	71	61	45
635-C	Track Veh Chassis Rebuild	103	33	48	52	60	42	47	64	62	56	38
635-T	Track Veh Rep	448	62	64	56	67	47	34	69	69	49	27
635-W	Automotive Mech	154	31	48	45	57	28	17	51	64	45	28

Table A-2 (continued)

Current MOS	Course Title	N	ACB Tests[a] RV	AR	PA	MA	ACS	ARC	SM	AI	EI	RI
710	Clerk	311	62	68	39	43	52	42	41	20	44	30
712	Stenography	569	49	50	38	33	46	32	24	16	28	15
714	Postal Operations	293	65	71	51	48	52	39	47	36	38	26
716.1	Personnel Admin	286	59	66	43	45	55	40	52	26	45	21
716.2	Personnel Mgt (Enl)	556	67	70	48	49	53	39	44	20	40	30
717	Adv Army Admin	406	65	63	44	46	53	26	35	34	37	31
743	Machine Acctg	383	60	69	59	50	53	45	39	27	47	33
763	Ord Storage Spec	291	69	75	50	58	57	36	65	45	44	33
911.2	Medical Aidman, Adv	308	61	61	57	52	44	50	48	34	50	41
917	Dental Asst	367	51	54	44	41	29	27	38	22	49	37
941	Cook	305	37	39	34	34	32	28	36	33	28	12
951	Military Police, Enl Adv	159	61	67	51	52	39	32	49	24	44	38
952	Disciplinary Guard, Enl	144	52	59	41	52	24	32	48	47	45	33
953	Criminal Investigation	192	62	63	51	57	42	24	41	31	54	49
051 (I)	Radio Op (Interm Speed)	150	22	18	12	19	22	32	07	13	16	09
051 (H)	Radio Op (High Speed)	233	23	27	12	31	23	48	16	30	27	22

[a]Decimal points omitted.

Table A-3

VALIDITY COEFFICIENTS[a] OF ACB TESTS FOR 41 ADDITIONAL MOS COURSE CRITERIA

Current MOS	Course Title	N	RV	AR	PA	MA	ACB Tests ACS	ARC	SM	AI	EI	RI
223	SAM Electronics Maintenance	1023	37	44	42	40	22	27	36	28	44	39
231	Electronic FC Equip Repair	210	16	30	33	41	01	19	39	40	47	36
233	Light FC Equip Maint	347	20	38	23	41	17	27	27	24	41	41
234	Heavy FC Equip Maint	308	45	63	57	56	36	44	50	41	64	58
294	Carrier Equipment Repair	898	68	75	64	64	52	46	61	37	71	58
311.1	Infantry Radio Maint	743	50	64	60	60	41	34	54	44	58	49
311.7	Infantry Communications Supv	483	44	57	52	46	40	40	49	31	44	32
312.1	Armor Radio Maint	567	44	48	45	56	36	35	46	45	61	54
313.1	Arty Radio Maint	503	42	55	55	55	37	23	47	38	60	50
313.7	Arty Communications Supv	498	46	52	52	46	38	40	41	30	43	37
322	Cable Splicing	235	34	54	48	52	33	17	48	48	48	37
331	Manual Central Office Rep	367	45	54	46	53	38	30	52	44	55	46
341	Teletype Maintenance	903	55	61	60	57	43	39	57	42	53	41
351	Power Equipment Maint	965	71	75	71	75	61	38	78	76	66	34
423	Heavy Artillery Repair	257	67	64	65	65	53	40	67	51	56	27
424.1	Turret Arty Maint	600	43	54	48	50	30	25	49	51	38	21
546 (F)	Fumigation and Bath Proc	239	19	32	24	34	28	16	31	32	18	-07
546 (L)	Ldry and Dry Cleaning Machine Operation	375	49	49	50	48	39	30	49	42	32	14
550	Supply Handling	693	51	60	36	51	49	35	49	52	33	00
621	Engineer Equip Maint	811	50	53	46	54	31	21	58	63	44	18

Table A-3 (continued)

Current MOS	Course Title	N	ACB Tests[a] RV	AR	PA	MA	ACS	ARC	SM	AI	EI	RI
631	Automotive Mechanics	352	46	56	49	62	33	20	56	69	52	40
632.1	Arty Track Veh Maint	585	39	44	30	48	28	23	51	58	44	27
675	Helicopter Maintenance	631	41	37	30	42	22	22	41	36	35	23
676	Reconnaisance Helicopter Rep	297	29	38	32	42	31	24	43	48	42	37
719	Transportation Mov Con	453	56	62	45	44	54	45	40	15	49	32
730	Finance Procedures	614	54	65	45	37	59	36	30	16	34	20
740	Tabulating Mech Op	224	56	64	53	52	43	29	37	22	47	38
760	Supply Records	766	51	57	42	40	51	39	37	24	35	19
768	Unit Supply	384	58	71	56	52	53	45	45	38	45	28
841	Motion Picture Photo	384	55	53	51	48	35	39	43	29	45	33
843	Still Photo and Photo Laboratory Procedures	1223	51	47	44	49	37	38	43	28	47	44
910	Medical Technician	471	33	28	20	29	23	20	23	22	24	15
914	Neuropsychiatric Proc	462	34	31	26	25	37	16	12	06	20	05
931	Medical Lab Proc	334	42	42	28	27	35	29	27	18	40	34
933	Preventive Medicine Proc	233	45	54	38	38	45	31	33	16	39	28
934	Food Inspection Proc	326	61	66	52	50	40	28	49	37	42	36
935	X-Ray	216	40	49	45	42	27	33	35	22	39	29
981	Cryptanalysis	477	58	69	53	52	35	24	40	28	40	37
982	Traffic Analysis	687	60	62	43	46	36	35	37	24	41	29
058	Morse Interception	559	44	48	38	28	31	41	17	14	29	31
059	Teletype Interception	498	43	50	38	38	17	24	35	22	34	25

[a]Decimal points omitted.

Table A-4

FACTOR LOADINGS ON TEN UNROTATED DIAGONAL FACTORS[a] FOR 34 MOS COURSE CRITERIA

Current MOS	Factor Loadings[b]									
	I (RV)	II (AR)	III (PA)	IV (MA)	V (ACS)	VI (ARC)	VII (SM)	VIII (AI)	IX (EI)	X (RI)
271-2	58	40	18	22	-08	20	04	-05	26	29
281	36	38	12	21	-11	-10	04	06	28	30
282	38	27	14	32	-12	01	-18	08	25	26
296	54	34	25	20	-04	09	12	07	22	16
320	45	25	20	12	-03	06	19	07	26	10
403	52	19	30	28	-07	01	06	10	13	10
411	54	25	10	08	11	-04	10	11	02	-03
421	53	33	27	26	07	-02	24	21	-07	-01
422	64	28	17	19	13	-11	11	22	04	-18
424.2	66	34	17	20	07	01	12	19	-08	01
442	55	17	30	27	-05	02	08	18	-08	-04
443	38	45	29	26	-06	-01	28	-04	01	08
452	38	25	30	36	-14	05	11	-03	01	06
632.2	48	32	23	35	-05	05	08	23	13	03
634	51	36	22	38	-26	06	19	23	11	12
635-c	33	35	30	35	09	20	30	20	12	05
635-t	62	30	16	31	03	-04	16	26	-03	-03
635-w	51	37	21	34	-05	-10	11	32	07	03
710	62	35	-08	04	18	07	-10	-13	14	06
712	49	23	05	01	19	03	-20	-04	06	-01
714	65	37	05	05	12	01	-07	02	-01	04
716.1	59	35	00	07	21	04	07	-12	11	-06
716.2	67	33	01	07	14	01	-13	-18	06	08
717	65	26	00	08	17	-12	-23	-04	09	13
743	60	38	18	07	12	07	-18	-07	14	08

Table A-4 (continued)

Current MOS	Factor Loadings[b] I (RV)	II (AR)	III (PA)	IV (MA)	V (ARC)	VI (ARC)	VII (SM)	VIII (AI)	IX (EI)	X (RI)
763	69	38	00	16	15	-06	11	01	-02	07
911.2	61	27	20	13	03	18	-03	-05	12	15
917	51	26	10	08	-07	00	-05	-11	24	14
941	37	19	10	10	07	06	06	10	00	-06
951	61	35	09	13	-03	-03	-04	-19	08	16
952	52	32	03	20	-15	05	02	11	07	09
953	62	28	10	20	00	-12	-21	-05	25	25
051-i	22	04	-02	09	12	23	-15	07	06	-01
051-h	23	15	-07	20	09	39	-11	19	08	06

[a]Pivoted on ACB Tests.
[b]Decimal points omitted.

Table A-5

FACTOR LOADINGS OF 34 MOS COURSE CRITERIA
ON TEN ACB FACTORS RESULTING FROM FIRST
ORTHOGONAL ROTATION

Current MOS	Factor Loadings[b] I (RV)	II[a] (AR)	III[a] (PA)	IV[a] (MA)	V[a] (ACS)	VI (ARC)	VII (SM)	VIII[a] (AI)	IX[a] (EI)	X (RI)
271-2	45	-06	06	-02	-10	26	37	-23	-06	53
281	25	-02	00	-05	-04	06	30	-02	00	60
282	24	-07	01	15	-09	21	26	03	03	56
296	39	-08	10	-07	-05	13	45	-10	01	42
320	33	-12	09	-18	-06	06	40	-08	03	30
403	36	-10	08	10	-10	14	48	03	00	31
411	49	01	03	-14	00	08	32	05	00	17
421	39	04	03	-10	07	12	63	09	-05	17
422	56	00	-01	-10	08	09	51	19	15	11
424.2	55	06	02	-09	03	19	52	11	-06	19
442	38	-02	07	07	-08	15	55	13	-05	15
443	27	11	03	-08	02	03	61	-19	-03	31
452	22	00	00	13	-09	10	56	-10	02	24
632.2	31	-03	01	-01	-03	24	56	10	08	33
634	26	04	00	-06	-22	23	64	05	00	42
635-c	16	-03	06	-13	12	28	65	-08	-02	26
635-t	45	00	-06	-10	00	18	57	18	-03	22
635-w	16	08	-01	-07	05	14	55	21	07	33
710	67	01	-08	-06	12	16	09	-15	03	29
712	54	04	03	05	13	15	07	02	07	17
714	65	07	00	-07	10	15	23	00	01	24
716.1	61	01	-05	-13	14	08	26	-18	03	19
716.2	70	04	-05	04	06	09	16	-14	-02	28
717	68	-03	-02	08	09	06	10	07	01	33
743	63	04	11	09	09	17	23	-10	06	35

Table A-5 (continued)

Current MOS	Factor Loadings[b] I (RV)	II[a] (AR)	III[a] (PA)	IV[a] (MA)	V[a] (ACS)	VI (ARC)	VII (SM)	VIII[a] (AI)	IX[a] (EI)	X (RI)
763	64	04	-14	-15	08	08	37	-01	01	23
911.2	53	-07	09	04	-02	23	32	-16	-06	31
917	44	-05	02	-04	-11	04	20	-16	03	38
941	32	-01	07	-04	03	09	31	04	04	11
951	57	06	-08	04	-07	03	25	-19	-05	36
952	40	09	-04	-05	-16	18	33	04	02	34
953	56	-09	-03	13	-04	07	17	01	02	54
051-i	21	-09	04	05	08	30	00	00	-01	05
051-h	17	-03	-02	-01	04	52	10	00	01	13

[a]Null factor in criterion space.

[b]Decimal points omitted.

Table A-6

FACTOR LOADINGS OF 41 ADDITIONAL MOS COURSE CRITERIA ON TEN ACB FACTORS RESULTING FROM FIRST ORTHOGONAL ROTATION

Current MOS	Factor Loadings[a] I (RV)	II (AR)	III (PA)	IV (MA)	V (ACS)	VI (ARC)	VII (SM)	VIII (AI)	IX (EI)	X (RI)
223	28	-04	08	02	-08	10	27	-11	-01	38
231	-02	-03	04	-04	-17	12	43	-09	06	38
233	13	00	-08	02	00	22	18	-14	03	46
234	34	-04	11	-02	-01	21	38	-20	00	56
294	60	-13	02	00	-01	12	36	-23	01	54
311.1	40	-02	06	02	02	10	43	-09	00	50
311.7	40	03	07	-04	06	11	38	-20	-01	26
312.1	30	-20	01	00	-01	23	34	-03	01	50
313.1	33	-10	06	04	04	03	38	-07	06	55
313.7	40	-03	11	06	01	16	31	-14	-05	31
322	26	06	02	-05	08	04	44	06	05	44
331	34	-09	-01	-07	03	12	38	-05	00	42
341	45	-05	07	00	-01	11	45	-12	-04	34
351	57	-06	01	-11	07	15	66	17	08	30
423	56	-10	02	00	00	10	54	-02	06	19
424.1	33	12	03	-04	-03	12	45	10	03	22
546 (F)	19	13	-08	-03	15	10	33	08	16	-01
546 (L)	42	03	03	02	01	10	43	05	-01	08
550	50	14	-13	-13	14	25	36	17	16	02
621	35	04	-03	-12	-08	11	52	21	08	17

Table A-6 (continued)

Current MOS	Factor Loadings[a] I (RV)	II (AR)	III (PA)	IV (MA)	V (ACS)	VI (ARC)	VII (SM)	VIII (AI)	IX (EI)	X (RI)
631	29	00	-02	-07	-02	16	51	26	02	43
632.1	24	-03	-10	-19	-02	20	41	16	04	23
675	29	-07	-08	-02	-11	12	30	03	00	18
676	17	-08	-01	-14	08	18	36	08	-03	31
719	60	-07	-02	00	13	15	14	-25	08	30
730	66	08	03	01	24	11	07	-07	08	25
740	56	01	02	15	02	05	19	-09	06	46
760	55	03	00	-02	15	16	18	-08	05	17
768	59	10	06	00	11	21	29	-04	06	30
841	47	-07	06	08	-10	15	29	-13	-01	28
843	41	-17	00	06	-05	17	26	-14	-08	34
910	28	-07	-06	02	-02	14	12	05	02	13
914	41	-06	-01	14	14	05	01	03	13	12
931	41	-13	01	-09	04	13	05	-08	01	30
933	49	-01	-02	00	14	08	13	-14	06	30
934	56	06	00	-01	-04	05	29	00	-06	35
935	36	03	06	08	-05	11	26	-17	02	30
981	56	14	00	12	-06	02	22	-03	-02	46
982	58	04	-03	06	-08	14	15	-08	04	32
058	45	04	14	07	-02	24	02	-10	-05	29
059	38	10	00	03	-16	05	22	-12	01	28

[a]Decimal points omitted.

Table A-7

FINAL FACTOR LOADINGS OF 75 MOS COURSE CRITERIA ON TEN ACB FACTORS RESULTING FROM SECOND ORTHOGONAL ROTATION

Current MOS	Factor Loadings[a] I (RV)	II (AR)	III (PA)	IV (MA)	V (ACS)	VI (ARC)	VII (SM)	VIII (AI)	IX (EI)	X (RI)
223	42	02	03	-02	-03	01	12	-02	03	37
231	16	08	01	-02	-11	-05	25	03	13	50
233	27	07	-08	03	10	08	01	04	02	48
234	54	04	05	-03	07	03	16	00	00	58
271	64	11	-01	-06	05	10	19	-05	-01	53
281	46	03	-01	-02	-06	-04	04	17	02	52
282	43	-07	-02	10	-06	16	06	10	07	52
294	78	-01	-08	-09	09	00	14	-03	01	46
296	55	01	03	-10	01	-02	27	05	03	43
311.1	58	-03	03	01	05	-04	20	08	-01	47
311.7	50	05	05	-04	16	-07	24	-04	-04	29
312.1	47	-09	-09	-09	00	13	17	10	01	50
313.1	53	-13	00	-03	01	-09	11	09	03	51
313.7	51	-02	06	-01	08	05	19	-05	-05	32
320	46	03	00	-19	-02	-07	27	07	05	30
322	41	-04	05	03	05	-12	20	25	01	42
331	49	-01	-06	-07	04	-01	20	13	-02	40
341	58	-01	02	-02	05	-03	29	01	-03	35
351	67	-10	00	-04	08	-03	52	33	04	28
403	50	-10	03	05	-07	05	35	05	04	34
411	54	04	03	-07	07	-01	26	17	00	09
421	47	-01	06	01	08	-09	52	23	-08	23
422	58	-10	02	00	14	-04	44	31	10	06
423	64	-08	-04	-01	08	-04	44	07	05	21
424.1	42	04	10	08	04	-03	34	21	04	23

Table A-7 (continued)

Current MOS	Factor Loadings[a] I (RV)	II (AR)	III (PA)	IV (MA)	V (ACS)	VI (ARC)	VII (SM)	VIII (AI)	IX (EI)	X (RI)
424.2	61	04	06	03	10	04	44	23	-07	17
442	46	-07	07	10	-05	05	48	12	-01	21
443	43	11	05	02	09	-24	39	04	-04	42
452	36	-02	-01	14	-01	-08	41	-04	06	38
546 (F)	17	-03	01	10	24	-07	29	20	07	05
546 (L)	45	-03	05	07	07	-02	38	09	-01	10
550	45	04	-02	07	32	07	37	34	08	-01
621	42	02	02	04	-02	-02	43	32	10	17
631	44	-04	02	05	-06	03	33	39	02	40
632.1	32	06	-09	-05	02	05	34	32	04	17
632.2	44	-05	01	04	04	06	43	22	08	40
634	45	13	02	07	-11	03	47	19	10	51
635 (C)	28	01	02	-10	16	-03	52	13	-07	47
635 (T)	53	01	-03	04	03	03	48	30	-03	22
635 (W)	28	-04	06	08	03	-05	38	37	04	38
675	36	04	-10	02	-04	06	24	09	05	17
676	28	-01	-04	-10	04	03	25	24	-07	34
710	70	06	-09	-05	29	08	00	05	-03	12
712	53	-07	05	03	24	12	03	09	00	03
714	68	04	03	-01	22	06	15	15	-04	10
716.1	64	07	-07	-10	28	-07	17	04	-04	11
716.2	75	04	-04	05	21	03	05	00	-04	12
717	73	-08	01	09	14	08	-02	15	-03	09
719	66	-02	-08	-09	29	04	04	-07	01	20
730	66	-06	06	00	35	03	-02	09	-03	07

Table A-7 (continued)

Current MOS	Factor Loadings[a] I (RV)	II (AR)	III (PA)	IV (MA)	V (ACS)	VI (ARC)	VII (SM)	VIII (AI)	IX (EI)	X (RI)
740	69	-08	01	11	11	01	-02	01	04	31
743	71	-06	10	03	23	08	10	01	01	25
760	56	-02	00	-02	28	06	13	06	-02	09
763	69	08	-11	-01	19	-06	26	21	-03	11
768	64	00	10	03	26	07	18	11	00	22
841	57	00	00	01	03	08	20	-08	03	25
843	54	-03	-10	-04	01	11	15	-07	-05	32
910	31	-02	-08	01	04	13	11	08	03	08
911.2	63	01	02	-04	11	12	23	-07	-04	30
914	40	-19	-02	06	18	07	-03	04	05	00
917	57	07	-03	-06	00	-02	05	-03	08	28
931	47	00	-06	-16	10	11	-02	04	-01	18
933	55	-03	-04	-03	23	00	00	02	-01	19
934	66	06	03	06	02	-01	14	12	-03	21
935	46	03	05	05	08	01	13	-08	04	30
941	36	-04	06	-03	07	00	25	10	02	11
951	69	12	-07	09	07	-05	08	-04	-01	24
952	51	15	01	08	-01	08	22	17	09	28
953	71	-10	-07	08	-01	09	-04	09	04	34
981	70	04	07	19	03	-01	01	08	01	28
982	66	07	-02	08	10	11	05	01	07	18
051 (I)	19	-06	-01	-05	16	28	07	-01	-04	06
051 (H)	16	06	-03	-03	22	40	18	06	-01	22
058	51	04	13	00	12	23	-02	-06	-04	20
059	48	14	03	10	00	-01	10	-03	08	22

[a]Decimal points omitted.

AD 23/1, 28/4

US Army Personnel Research Office, OCRD, DA
GROUPING ARMY TRAINING COURSES BY ARMY CLASSIFICATION BATTERY FACTORS by William H. Helme and David J. Fitch. October 1962. Rept. on New Classification Techniques c-II Proj.--31 pp incl 3 tables, 2 figures, 6 Ref. (USAPRO Technical Research Note No. 128)
(DA Project 0J95-60-001) Unclassified Report

Present report interprets results of a factor analysis of Army Classification Battery (ACB) tests, extended to 75 MOS criteria (final grades in enlisted training courses) in terms of test-job interrelationships and occupational groupings. Of the ten job groups into which the 75 MOS were allocated, nine were well differentiated by ACB test combinations closely resembling current aptitude area selectors. Validity patterns suggested feasibility of clustering MOS courses for classification purposes on the basis of technical level as well as on content. Academic skills were found to play a part in success in all courses. Results of the analysis were interpreted as additional guidelines for developing new ACB measures and for eventual reconstitution of the Aptitude Area system.

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